

Amendments to the Claims

Claims 1-21 (Canceled)

Claim 22 (New) A power supply system for selectively supplying power to a load that operates with both AC power and DC power, the power supply system comprising;

a storage battery that stores DC power;

a plurality of DC power sources including a wind turbine generator, a solar cell and a fuel cell, each having a rated voltage made equal to a rated voltage of the storage battery, and an output of each being connected to the storage battery;

a switching device connected in series between a utility AC power source and the load, and connected in series between the storage battery and the load, the switching device switching between supplying power from the utility AC power source to the load and supplying power from the storage battery to the load;

a bidirectional converter;

a three-winding electronic transformer having a first bidirectional terminal for connection to the storage battery, a second bidirectional terminal for connection to the utility AC power source, a third bidirectional terminal for connection to the load, a high frequency transformer that matches and insulates a voltage on a storage battery side of the three-winding electronic transformer and a voltage on a load side of the three-winding electronic transformer, a first modulation/demodulation semiconductor switch connected to a winding at the storage battery side, a second modulation/demodulation semiconductor switch connected to a winding at a utility AC power source side of the three-winding electronic transformer, and a third modulation/demodulation semiconductor switch connected to a winding at the load side; and

a controller that controls operation of the three-winding electronic transformer by controlling operation of the switching device, wherein

the three-winding electronic transformer has a bidirectional function and an AC/DC converting function,

the first bidirectional terminal of the three-winding electronic transformer is connected via the bidirectional converter and the storage battery to the DC power sources,

the second bidirectional terminal of the three-winding electronic transformer is connected via the switching device to the utility AC power source,

the first, second and third bidirectional terminals are insulated from each other, and

the controller controls the operation of the three-winding electronic transformer to (1) during a first time period, (i) supply AC power from the utility AC power source to the load while the storage battery is being charged by at least one of the DC power sources until the storage battery is fully charged and (ii) supply DC power from the storage battery to the load once the storage battery has been fully charged or if the utility AC power source fails, and (2) during a second time period, (i) supply the AC power from the utility AC power source to the load and (ii) convert the AC power from the utility AC power source into DC power and supply the DC power to the storage battery to charge the storage battery by the bidirectional function and the AC/DC converting function of the three-winding electronic transformer, and

the fuel cell charges the storage battery while the storage battery is being discharged.

Claim 23 (New) A power supply system for selectively supplying power to a load that operates with only AC power, the power supply system comprising:

a storage battery that stores DC power;

a plurality of DC power sources including a wind turbine generator, a solar cell and a fuel cell, each having a rated voltage made equal to a rated voltage of the storage battery, and an output of each being connected to the storage battery;

a switching device connected in series between a utility AC power source and the load;

a bidirectional converter;

a three-winding electronic transformer having a first bidirectional terminal for connection to the storage battery, a second bidirectional terminal for connection to the utility AC power source, a third bidirectional terminal for connection to the load, a high frequency transformer that matches and insulates a voltage on a storage battery side of the three-winding electronic transformer and a voltage on a load side of the three-winding electronic transformer, a first modulation/demodulation semiconductor switch connected to a winding at the storage battery side, a second modulation/demodulation semiconductor switch connected to a winding at a utility AC power source side of the three-winding electronic transformer, and a third modulation/demodulation semiconductor switch connected to a winding of the load side; and

a controller that controls operation of the three-winding electronic transformer by controlling operation of the switching device, wherein

the three-winding electronic transformer has a bidirectional function and an AC/DC converting function,

the first bidirectional terminal of the three-winding electronic transformer is connected via the bidirectional converter and the storage battery to the DC power sources,

the second bidirectional terminal of the three-winding electronic transformer is connected via the switching device to the utility AC power source,

the first, second and third bidirectional terminals are insulated from each other,

the first modulation/demodulation semiconductor switch includes two unidirectional switches or two pairs of unidirectional switches,

the controller controls the operation of the three-winding electronic transformer to (1) during a first time period, (i) supply AC power from the utility AC power source to the load while the storage battery is being charged by at least one of the DC power sources until the storage battery is fully charged and (ii) supply AC power from DC power stored in the storage battery to the load once the storage battery has been fully charged or if the AC power source fails by demodulating the DC power into single-phase full-wave form per half cycle by the bidirectional converter, alternately reversing a high frequency modulation phase of the two unidirectional switches or the two pairs of unidirectional switches of the first modulation/demodulation semiconductor switch per half cycle of a utility AC power frequency and then demodulating into sinusoidal wave AC output by the third modulation/demodulation semiconductor switch, and (2) during a second time period, (i) supply the AC power from the utility AC power source to the load and (ii) convert the AC power from the utility AC power source into DC power and supply the DC power to the bidirectional converter to perform a boost type rectifying operation at a high power to the DC power and supplying the DC power to the storage battery to charge the storage battery by the bidirectional function and the AC/DC conversion function of the three-winding electronic transformer,

the three-winding electronic transformer converts the DC power from the storage battery into AC power when the storage battery has been substantially fully charged at a load in an off-peak period for the electric power supply and the utility AC power source has not failed on a side

of the three-electronic transformer of the utility AC power source to achieve a reverse flow of the AC current, and

the fuel cell charges the storage battery while the storage battery is being discharged.